

37
CLAIMS

1. Signalling procedure in wireless networks according to the rules of an open communication model foreseen protocol stacks are at the interfaces between network elements, the stacks including hierarchical Layers, whose general meaning is known, listed top-down as: Application (AL), Transport (TL), Data Link (DLL), Physical (PHL) for supporting the playback of streaming services, transmitted by a Service Provider (SP, ISP) to wireless subscriber/s (MS) through the messages of a real-time protocol (RTP/RTCP) at Transport Layer (TL) also including ordinary Receiver Reports (RR) feedback to the Service Provider by the subscriber/s (MS) at a rate set by default, and said Receiver Reports (RR) including measurement values of parameters (MR) indicative of the QoS at the subscriber side during the ongoing session, so that the Provider adapts the QoS of the streaming service E2E, accordingly, **characterised in that** includes the following steps performed at the wireless subscriber side:

- a) detecting concurrently with said real-time protocol if a first condition depending on the measured parameters (MR) comes true for indicating that the QoS at the subscriber side (MS) is degrading to an attention level, and when this first condition applies, sending, at Data Link Layer (DLL), a command (SFS) to the Transport Layer (TL) to switch towards the sending of upgraded Receiver Reports (FRR) triggered and updated at Data Link Layer (DLL) at a rate faster than said default one;
- b) detecting concurrently with the faster signalling (FRR) if a second condition depending on said measured parameters (MR) comes true for indicating that the QoS at the subscriber side (MS) is raised over a threshold greater than said attention level, and when this second condition applies, sending, at Data Link Layer (DLL), a

command (TLastFRR) to the Transport Layer (TL) to reinstate the ordinary receiver reports (RR) at the default rate.

2. The procedure of the preceding claim, characterised in that said faster rate is equal to the measurement reporting (MR) rate from the Physical Layer (PHL).

3. The procedure of one of the preceding claims, characterised in that said first and second conditions are tested at Physical Layer (PHL).

4. The procedure of one of the preceding claims, characterised in that said upgraded received reports (FRR) include additional information on the actual value of the available service bandwidth (B_{Um}) at the subscriber side (MS).

5. The procedure of the preceding claim, characterised in that said upgraded received reports (FRR) include additional information on the actual filling in level (BL) of a delay compensating buffer managed at the Application Layer (AL) at the subscriber side (MS) for accommodating the incoming data and play-backing the streaming service.

6. The procedure of the preceding claim, characterised in that said upgraded receiver reports (FRR) are obtained at step a) by the following sequential steps:

every time a measurement reporting (MR) is received at Data Link Layer (DLL), a first inter-protocol message (TFRR) including said actual value of the available service bandwidth (B_{Um}) is sent from this Layer to the Transport Layer (TL);

every time the first inter-protocol message (TFRR) is received at Transport Layer TL, a second inter-protocol message (GetBL) is sent from this Layer to the

39

Application Layer (AL) to have returned information on the state of the Application buffer (BL); every time the second inter-protocol message (GetBL) is received at Application Layer (AL), a third inter-protocol message (BL) including the actual value of the buffer level (BL) is sent back from this Layer to the Transport Layer (TL); every time the third inter-protocol message (BL) is received at Transport Layer (TL), said upgraded receiver reports (FRR) is obtained by integrating all information included in ordinary receiver reports (RR) and the information transferred at the Transport Layer (TL) by the first (TFRR) and third (BL) inter-protocol messages.

7. The procedure of one of the preceding claims, characterised in that the following steps are further executed:

detecting concurrently with said faster signalling (FRR) if a condition for triggering a cell reselection procedure which depends on said measured parameters (MR) comes true after than said first condition is not more verified due to a QoS worsening under said attention level;

suspending in the affirmative case the sending of the faster signalling (FRR) and entering a handshake phase (CCN, PDA) with the network (BSC) for selecting a new serving cell; then

generating a command (TLastFRR) towards the Transport Layer (TL) to terminate the sending of said faster signalling (FRR) and reinstating the ordinary receiver reports (RR) with the default rate.

8. The procedure of one of the preceding claims, characterised in that said wireless network is connected to

40

the Internet Network IP-PDN) and the Service Provider (ISP) transmits streaming services through the Internet Network IP-PDN) .